



Partial translation of JP5-79085 A

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[0015] Fig. 1 is a perspective view showing an embodiment in which a sanitary washing apparatus according to the present invention is installed on a toilet bowl body.

[0016] In Fig. 1, the whole of the sanitary washing apparatus is covered with a casing 1 fixed to a toilet bowl body 50. A toilet seat 1a and a toilet cover 1b are respectively mounted on the casing 1 so as to be capable of being opened or closed, and an operation panel 20 for operating a nozzle device and other functional units and setting the temperature or the like of washing water is provided on an upper surface on the left side as viewed from the front.

[0017] Fig. 2 is a vertical sectional view in the casing 1 showing a nozzle device part, and Fig. 3 is a vertical sectional view of a principal part showing a nozzle head part.

[0018] A base 2 in a nozzle device is fixed in the casing 1, and a nozzle body 3 is incorporated into the base 2 so as to be movable in its axial direction. The base 2 has a sliding surface 2a in a concavely-curved shape receiving a lower surface of the nozzle body 3 in a pipe shape formed therein, and has a cleaning chamber 2b for cleaning a nozzle head 4 in the nozzle body 3 provided at its front end. Further, a drive motor 5 is fixed to a base end of the base 2, and the nozzle body 3 is mechanically connected to its output shaft. The reciprocal rotation of the output shaft

of the drive motor 5 causes the nozzle body 3 to advance or retreat, to carry out control such that the nozzle head 4 is positioned at two washing positions so as to be used for anus washing and for bidet.

[0019] The nozzle body 3 has two flow paths formed in its inner part, as shown in Fig. 3, to take one of them as a first flow path 3a used for anus washing and take the other as a second flow path 3b used for bidet. Base ends of the first and second flow paths 3a and 3b are respectively provided with connection ports 3c and 3d, as shown in Fig. 2, and the connection ports respectively communicate with a washing water source side by the separate flow paths.

[0020] The nozzle head 4 has a axial length accommodated in the cleaning chamber 2b when the nozzle body 3 is accommodated therein as shown in Fig. 2. The inside of the nozzle head 4 is divided into two chambers. One of the chambers has a first spray hole 4a for anus washing provided on its upper surface in communication with the first flow path 3a in the nozzle body 3, and the other chamber has a second spray hole 4b used for bidet provided on its upper surface in communication with the second flow path 3b.

[0021] Fig. 4 is a schematic view showing a supply system of washing water, including the operation panel 20.

[0022] In a supply path of washing water to the nozzle device, a valve unit 6a having an opening/closing valve and flow rate adjustment valve function, a hot water tank 6b, and a flow rate adjustment switching unit 6c are arranged in this order. The flow rate adjustment switching unit 6c comprises an inflow portion from the hot water tank 6b and

two outflow portions, and has an opening/closing valve mechanism for separately opening and closing flow paths to the outflow portions and a flow rate adjustment valve capable of adjusting the flow rates thereof incorporated therein, and is utilized for a flow path system of general water-section equipment. Two supply pipes 6d and 6e are connected to the flow rate adjustment switching unit 6c. The supply pipes 6d and 6e are respectively connected to the connection ports 3c and 3d in the nozzle body 3.

[0023] All the driving of the nozzle device, the setting of the cleaning position, and the setting of the temperature of hot water by the hot water tank 6b, for example, and the valve unit 6a and the flow rate adjustment switching unit 6c are controlled by a controller 7. The functional units are operated by switches arranged in the operation panel 20. For example, when the first spray hole 4a is used, the rotation amount of the output shaft of the drive motor 5 is set by the controller 7, and the supply of washing water from the flow rate adjustment switching unit 6c is also switched only toward the supply pipe 6e. Further, also in the case of the second spray hole 4b, the stroke of the nozzle body 3 is also similarly set to a large value, and the supply of washing water is also switched toward the supply pipe 6d.

[0024] The cleaning chamber 2b has such a shape as to cover the whole of the nozzle head 4 in the nozzle body 3 at the accommodation position, as shown in Fig. 3. If washing water is supplied from either one or both of the first flow path 3a and the second flow path 3b, the washing water is

sprayed into the cleaning chamber 2b from one or both of the first and second spray holes 4a and 4b. Therefore, the sprayed washing water rebounds from an inner wall of the cleaning chamber 2b, so that filth or the like which flows along a peripheral surface of the nozzle head 4 to adhere thereon can be washed away.

[0025] Fig. 5 is a schematic view showing an example of the operation panel 20.

[0026] The operation panel 20 is provided with a stop switch 21 for stopping the operation of each of the functional units, a first washing switch 22 for anus washing, a second washing switch 23 used for bidet, and a drying switch 24 for drying the functional unit by hot air from a hot-air fan (not shown) after washing. Further, there are provided temperature adjustment switches 25a and 25b for adjusting the temperature of washing water and the temperature of hot air, and flow rate adjustment switches 26a and 26b for adjusting a washing water flow rate. Indicating lamps 22a, 23a, and 24a for indicating operating conditions are respectively provided near the first and second washing switches 22 and 23 and the drying switch 24.

[0027] The indicating lamps 22a to 24a respectively light up in order to indicate that the functional unit is in an operating state at the time of washing and hot-air drying. When the first washing switch 22 and the second washing switch 23 are turned on and when the stop switch 21 is pressed, the indicating lamps are controlled by the controller 7 such that they blink in order to indicate that cleaning is being done. A user can understand the meaning

of the blinking if the indication that cleaning is being done by the blinking is provided on a wall inside a rest room or the operation panel 20.

[0028] Fig. 6 is a schematic view showing cleaning of the nozzle head 4 before washing of the private parts, and Fig. 7 is a timing chart showing the nozzle body 3 in this case and lighting and blinking of the indicating lamps 22a and 22b.

[0029] When the first washing switch 22 is turned on, the drive motor 5 is not operated, and the valve unit 6a is opened so that washing water is supplied to the first flow path 3a for a predetermined time period (approximately one second). Consequently, the washing water is sprayed from the first spray hole 4a in the nozzle head 4, so that the nozzle head 4 is cleaned, as described in Fig. 3. In this cleaning time period, the indicating lamp 22a continues to blink, to indicate that the nozzle head 4 is being cleaned. It is assumed that a time period during which the indicating lamp 22a blinks is longer (by approximately three seconds) than the actual cleaning time period so that a user easily confirms that the nozzle head 4 is being cleaned. When the cleaning time period has elapsed, the drive motor 5 is operated, to advance the nozzle body 3 to its washing position. Thereafter, washing water is supplied again so that the private parts are washed.

[0030] Fig. 8 is a schematic view showing cleaning after termination of the washing of the private parts, and Fig. 9 is a timing chart at that time.

[0031] When the stop switch 21 is pressed, the drive motor

5 is operated to return the nozzle body 3 to its original accommodation position, to accommodate the nozzle head 4 in the cleaning chamber 2b, as shown in Fig. 3, and stop the nozzle head 4 (Fig. 8 (b)). Thereafter, the valve unit 6a is opened again so that washing water is supplied to the first flow path 3a, and the nozzle head 4 is cleaned in the cleaning chamber 2b, as in the initial case. The cleaning time period shall be approximately three seconds longer than the initial washing time period. During this time, the indicating lamp 22a continuously blinks, to indicate that the nozzle head 4 is being cleaned. If the cleaning is terminated, the supply of the washing water is stopped, so that the nozzle head 4 is maintained in a steady accommodated state.

[0032] The nozzle device is thus operated by the first washing switch 22, while washing utilizing the second spray hole 4b by the second washing switch 23 is also done in exactly the same way.

[0033] Furthermore, the process of nozzle cleaning can be carried out by sharing the indicating lamps 22a and 23a indicating a nozzle cleaning operation. That is, when the private parts are washed, both the indicating lamps 22a and 23a light up, to indicate that washing is being done. However, at the time of nozzle cleaning, the indication is switched to blinking. Therefore, the necessity of separately providing indicating means indicating nozzle cleaning is eliminated, and the necessity of newly incorporating an indicating lamp or the like into the operation panel 20 is eliminated.

[0034] Fig. 10 is a schematic view of the operation panel 20, showing an example in which another means indicates that cleaning is being done in place of the blinking of the indicating lamps 22a and 23a.

[0035] The structure of Fig. 10(a) is the same as the conventional structure in which the indicating lamps 22a to 24a keep lighting when corresponding apparatuses thereto are operating. A liquid crystal screen 27 is provided to inform a user of cleaning of the nozzle head 4 and other messages. This liquid crystal screen 27 is controlled by the controller 7 so that the message of "nozzle is being cleaned", for example, can be indicated in the time domain where the indicating lamps blink, in the time charts of Figs. 7 and 9.

[0036] Providing the liquid crystal screen 27 allows the user to easily know that the nozzle head 4 is being cleaned at the time point where the first or second washing switch 22 or 23 or the stop switch 21 is pressed.

[0037] Furthermore, Fig. 10 (b) is an example in which there is provided a speaker 28 such that the user can confirm by his or her ears that the nozzle head 4 is being cleaned in place of blinking of the indicating lamps 22a and 23a and visual display of image information or the like by the liquid crystal screen 27.

[0038] This speaker 28 is controlled by the controller 7 so as to be able to generate pre-programmed sounds, that is, it may repetitively output, for example such a sound as "nozzle is being cleaned" in the time domain where the indicating lamps blink in Figs. 7 and 9. This speaker 28 enables the

user to easily know that the nozzle head 4 is cleaned without looking at the operation panel 20 to check each time.

[0039] As described above, using the blinking of the indicating lamps 22a, 23a, the display by the liquid crystal screen 27 and the sound or the like from the speaker 28 makes it possible to easily inform the user that the nozzle head 4 of the nozzle body 3 is cleaned before and after it is used. Thus, the user can recognize that the nozzle body 3 which will now be used for washing is clean as it has already been cleaned, and thus he/she can use it comfortably without feeling dirty or uncomfortable.

[0040] Although in the present embodiment, cleaning is done two times, i.e., before the nozzle body 3 is advanced to the washing position and when the nozzle body 3 is returned to the accommodation position after being used, cleaning can be done only before the use or only after the use. Further, the cleaning chamber 2b may be provided for the cleaning. Alternatively, a cleaning mechanism for causing washing water to flow along the peripheral surface of the nozzle head 4 to clean the nozzle head 4 may be provided, as disclosed in the publication taken in the item "Prior Art".

[0041] In addition, the blinking time that the indicating lamps 22a, 23a on the operation panel 20 indicate nozzle cleaning can be set arbitrarily such as being longer than the cleaning time of the nozzle head 4 both before and after the nozzle apparatus is used. Further, while the operation panel 20 is set in a casing 1 secured on the toilet body 50, it may be replaced with a remote controller which is hung on



the wall or the like of the rest room.

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[Brief Description of the Drawings]

[FIG. 1] A perspective view of toilet bowl facilities comprising a sanitary washing apparatus according to the present invention.

[FIG. 2] A vertical sectional view of a principal part showing a nozzle device part.

[FIG. 3] A vertical sectional view of a principal part in a case where a nozzle head part is accommodated in a cleaning chamber.

[FIG. 4] A schematic view showing a supply system of washing water to a nozzle device, including an operation panel.

[FIG. 5] A schematic view of an operation panel, showing the cleaning conditions of a nozzle by blinking of an indicating lamp.

[FIG. 6] A schematic view showing the movement of a nozzle body and the cleaning conditions in a case where a nozzle head is cleaned before use.

[FIG. 7] A timing chart of the supply of washing water, a drive motor, and blinking of an indicating lamp in the case of Fig. 6.

[FIG. 8] A schematic view showing the movement of a nozzle body and the cleaning conditions in a case where a nozzle head is cleaned after use.

[FIG. 9] A timing chart of the supply of washing water, a drive motor, and blinking of an indicating lamp in the case of Fig. 8.

[FIG. 10] A diagram showing another example of an operation panel, where Fig. 10 (a) is a schematic view of an example in which a liquid crystal screen is used for indicating that a nozzle is being cleaned, and Fig. 10 (B) is a schematic view of an example in which there is provided a speaker.

[Description of Reference Numerals]

- 1 casing
- 2 base
- 3 nozzle body
- 4 nozzle head
- 5 drive motor
- 6a valve unit
- 6b hot water tank
- 7 controller
- 20 operation panel
- 21 stop switch
- 22 first washing switch
- 23 second washing switch
- 27 liquid crystal screen
- 28 speaker

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FIG. 10... During nozzle cleaning

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FIG. 7

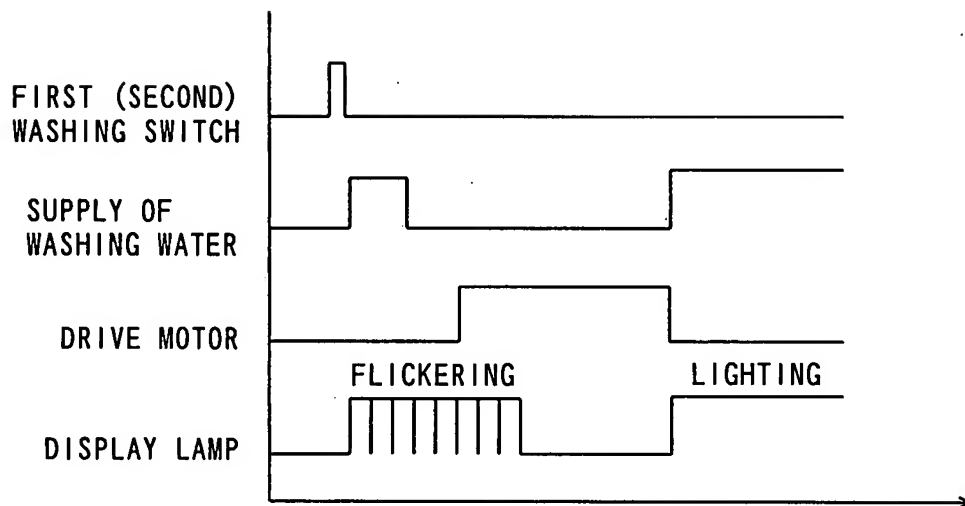


FIG. 9

